

### **REMARKS**

Claims 1-5, 7-20, and 22-25 have been amended. Applicant has canceled Claims 21, 26, and 34. Applicant has added new Claims 35-50. No new matter is added by the amendments as discussed below. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the above amendments and the following remarks.

#### **Rejection Under 35 U.S.C. § 112**

Claims 1-5, 7-26, and 34 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. While Applicant disagrees with the rejections, in order to expedite prosecution Applicant has amended Claims 1-5, 7, 8, 12, 14-20, 23-26, and 34, and has canceled Claims 21, 26, and 34.

Specifically, Applicant has amended Claims 1-5, 7-20, and 22-25 into system claims. Additionally, Applicant has amended Claims 1 and 18 to address the antecedent basis issues raised by the Examiner, and to more clearly define the "backlash". The newly added method claims, Claims 38-50, do not display the issues raised by the Examiner in connection with the formerly pending method claims.

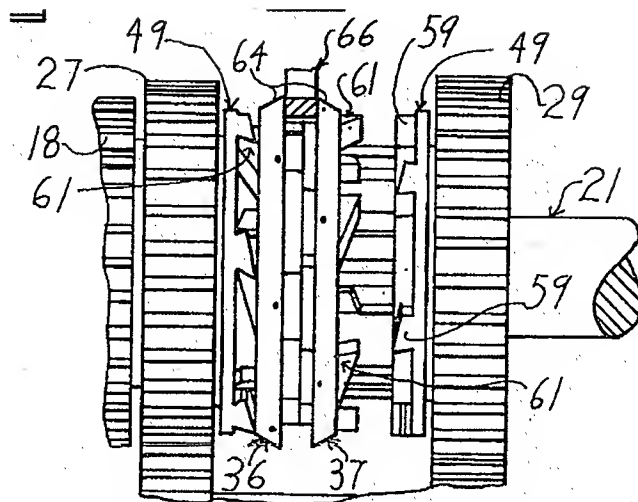
For at least the reasons described above, Applicant submits that Claims 1-5, 7-20, and 22-25 satisfy 35 U.S.C. § 112.

#### **Rejection of Claims 1-5, 7-19, 21-24, and 34 Under 35 U.S.C. §103(a)**

Claims 1-5, 7-19, 21-24, 26, and 34 were rejected under 35 U.S.C. §103(a) as being unpatentable over US 3,872,737 to Thomas (Thomas '737). For the reasons discussed below, the presently pending claims are nonobvious over Thomas '737.

Thomas '737 is described on the following pages.

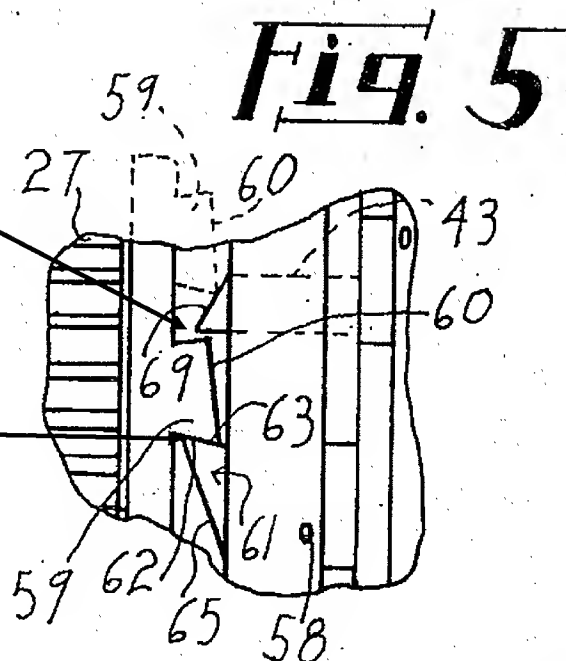
Thomas '737



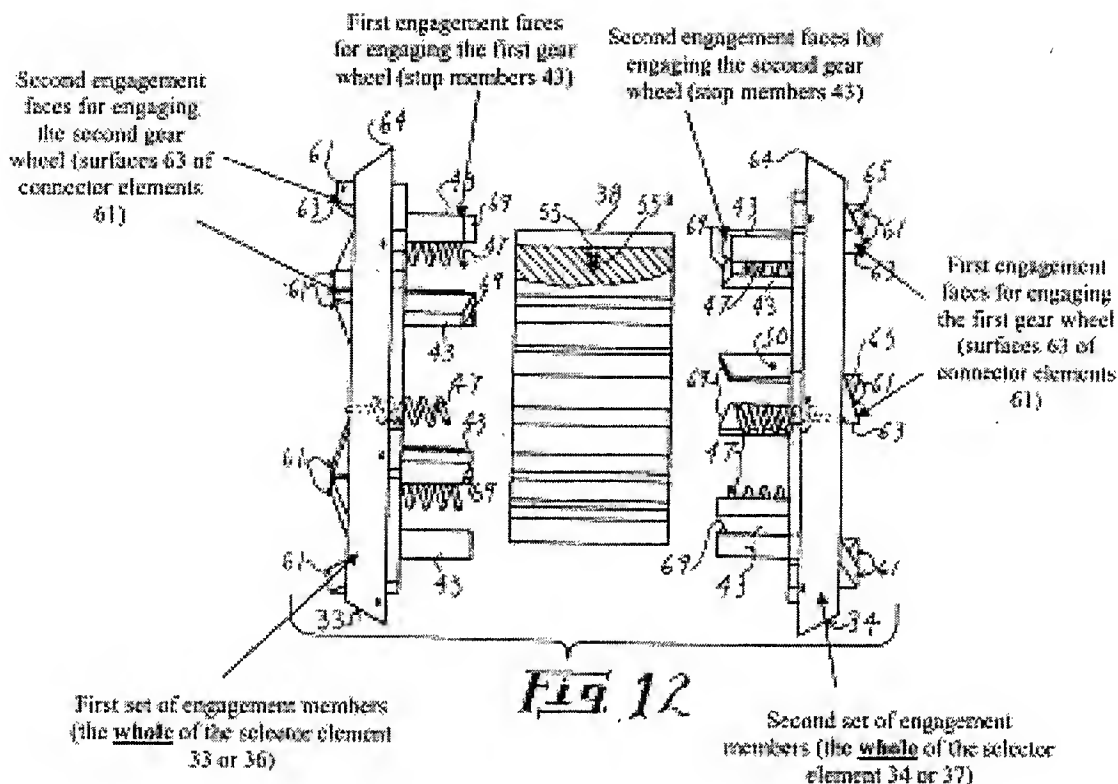
**Fig. 4**

When decelerating, drive pressure is between stop members 43 and connector elements 59. Therefore the **stop members 43** are “loaded” with respect to the engaged second gear wheel 27 and the **connector elements 61** are “unloaded” with respect to the engaged gear wheel 27.

When accelerating, drive pressure is between the connector elements 59 and the connector elements 61 as shown in Figure 5, thus the connector elements 61 are “loaded” with respect to the engaged second gear wheel 27. The stop members 43 are consequently “unloaded”



**Fig. 5**



As described and illustrated in Thomas '737, to engage a lower gear 29 when performing a decelerating downshifting, an actuator 66 is moved to the right, thus moving a gear selector element 37 towards a connector element 59 (and hence first gear 29), in a manner such that it engages the connector element 59 with connector elements 61 (see Thomas '737, column 6, lines 34 to 57; Figure 4 above). Referring to Figure 5 above, this has the effect of moving the **"loaded" stop members 43** out of engagement with the currently engaged gear wheel 27 by disengaging the connector element 64, since the stop members are integrally formed with the gear selector element 37 (see Thomas '737, figure 12 above). Thus it is the **loaded** set of engagement members with respect to the currently engaged second gear (gear 27) that are moved when performing a decelerating downshift in the transmission of Thomas '737.

Furthermore, it is the members (61) of Thomas '737 that always make the initial contact with the elements (59) when changing gear. This occurs regardless of the type of shift that is performed, i.e. whether it is an upshift or a downshift.

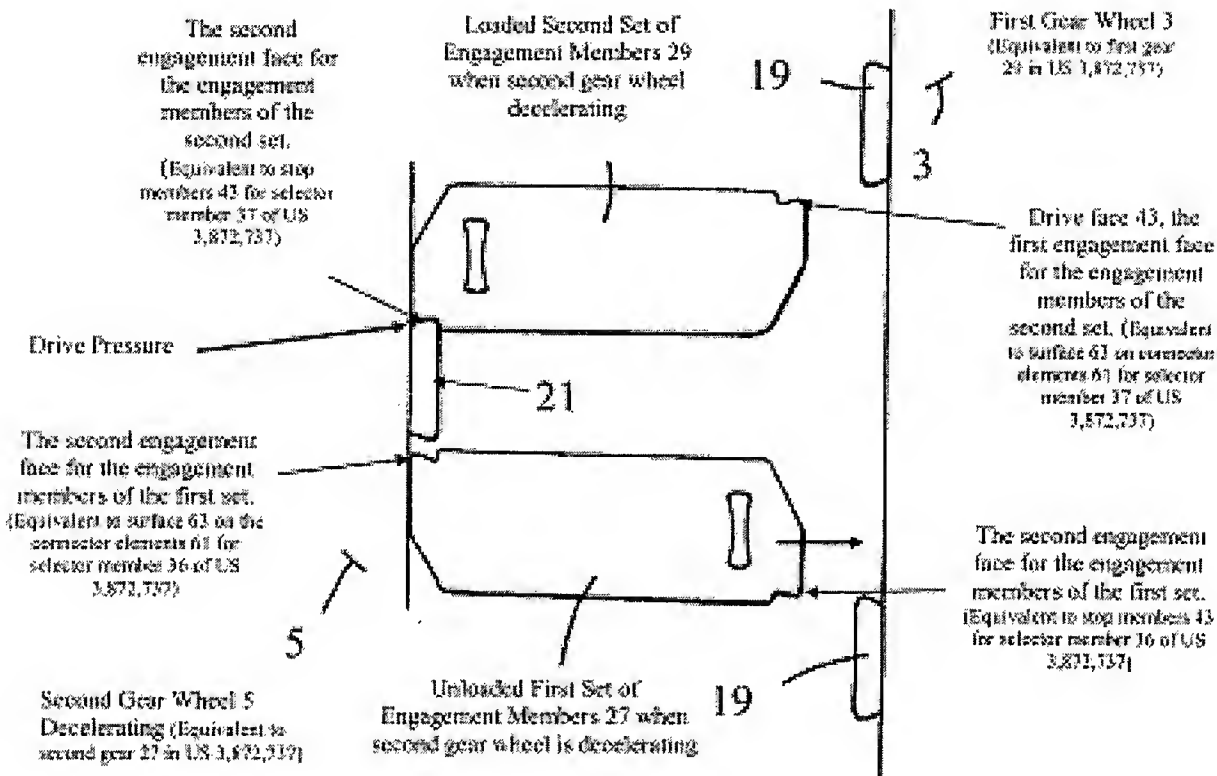
Additionally, it is clear from Figures 2 to 4 of Thomas '737 that the actuator of Thomas '737 can only push each connector element 36, 37 in one direction. The springs 47 cause the follow up movement. Thus the selector assembly of Thomas '737 always has to engage a new gear using the connector elements 61, it cannot engage a new gear with the stop members 43 at all. In Thomas '737, the stop members provide a follow upholding function and are never used to initially select a new gear.

Applicant submits that Thomas '737 does not disclose or suggest a system for initially moving an unloaded first set of engagement members into driving engagement with a first gear wheel to effect a decelerating downshift. Nor does Thomas '737 disclose that backlash between first and second sets of engagement members and drive formations when moving between acceleration and deceleration is less than or equal to four degrees.

In contrast, Claim 1 of the present application recites (emphasis added):

1. A transmission system comprising first and second rotatable shafts, said first shaft having a longitudinal axis, and means for transferring drive from one of the shafts to the other shaft comprising first and second gear wheels each rotatably mounted on the first shaft and having drive formations formed thereon, a selector assembly for selectively transmitting torque between the first shaft and the first gear wheel and between the first shaft and the second gear wheel, wherein the selector assembly comprises an actuator assembly and first and second sets of engagement members, wherein each engagement member includes a first engagement face for engaging the first gear wheel and a second engagement face for engaging the second gear wheel, said actuator assembly including a shift fork assembly arranged to move each of the first and second sets of engagement members in first and second directions along the longitudinal axis of the first shaft into and out of engagement with the first and second gear wheels independently of each other, the arrangement being such that **when one of the first and second gear wheels is selected by the first and second sets of engagement members backlash between the first and second sets of engagement members and the drive formations when moving between acceleration and deceleration is less than or equal to four degrees, and the transmission being further arranged such that when the first gear is selected by the first and second sets of engagement members and a driving force is transmitted the second set of engagement members drivingly engages the selected first gear wheel, and the first set of engagement members is then in an unloaded condition, wherein the shift fork assembly is arranged to move the unloaded first set of engagement members into driving engagement with the second gear wheel to effect a gear change.**

As illustrated and explained in detail below, Applicant submits that Claim 1 differs from Thomas '737.



In contrast to Thomas '737, and as illustrated above, the present application describes moving the **"unloaded"** set of engagement members 27 **with respect to the currently engaged second gear wheel 5** into engagement with the first gear 3 when undertaking a decelerating downshift (see pages 10 and 11 – paragraphs 0060 to 0062 in Applicant's published application US 2006/0207362). This happens because the actuator arrangement of the present application is different from Thomas '737 in that it can push/pull the sets of engagement members 27, 29 in both axial directions along the shaft 1 (see Applicant's Figure 1). When performing a decelerating downshift, Applicant's system can initially engage the new lower gear with the equivalent of the stop members 43 of Thomas '737. Thus, in contrast to Thomas '737, the first and second sets of engagement members are equivalent to each other. That is, it is possible to initially engage a new gear with either the first or the second set of engagement members, the

actual selection depending upon the start position, the direction of torque (accelerating or decelerating) and the type of shift requested.

Applicant further notes that in Applicant's system, the first and second sets of engagement members are movable into and out of engagement with the first **and** second gear wheels independently of each other and that it is clear from the description of Thomas '737 that the connector elements 61 of the gear selector element 37 do not engage the gear 27. The connector elements 61 of the gear selector element 37 can only be said to engage the gear 27 when the entirety of the gear selector element 37 is considered to constitute the second set of engagement members.

Applicant further notes that Thomas '737 does not disclose or suggest the range of backlash recited in Claim 1. It is submitted that the range of backlash is an important aspect of the invention, and at the priority date of the invention was contrary to the industry trend for dog-type transmission systems, which is clearly shown in the introductory paragraphs of Applicant's specification. Thus it is submitted that this relates to more than a mere workshop selection.

For at least the reasons described above, Applicant submits that Claim 1 is patentably distinguished over Thomas '737. Applicant submits that Claims 2-5, 7-19, and 22-24 are also patentably distinguished over Thomas '737, not only because they depend from Claim 1, but also on their own merit.

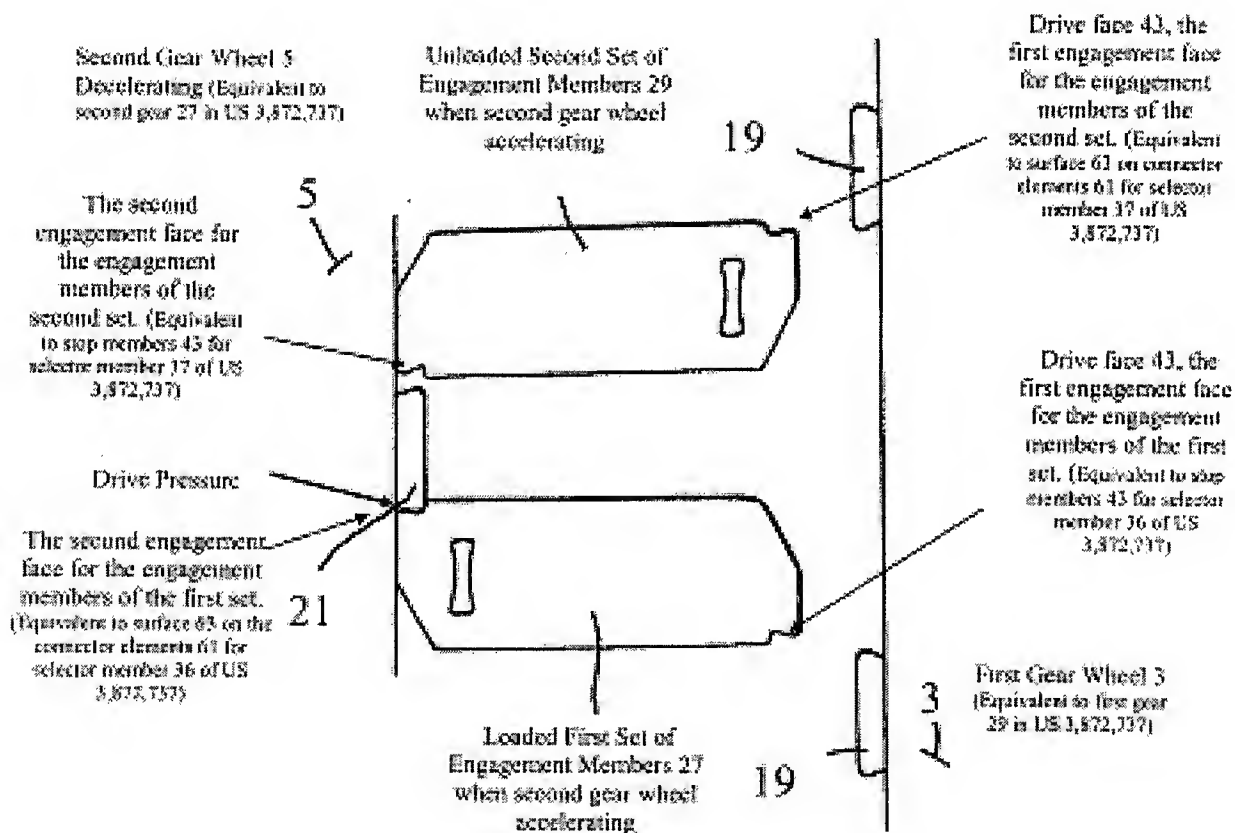
#### **Rejection of Claim 26 Under 35 U.S.C. §103(a)**

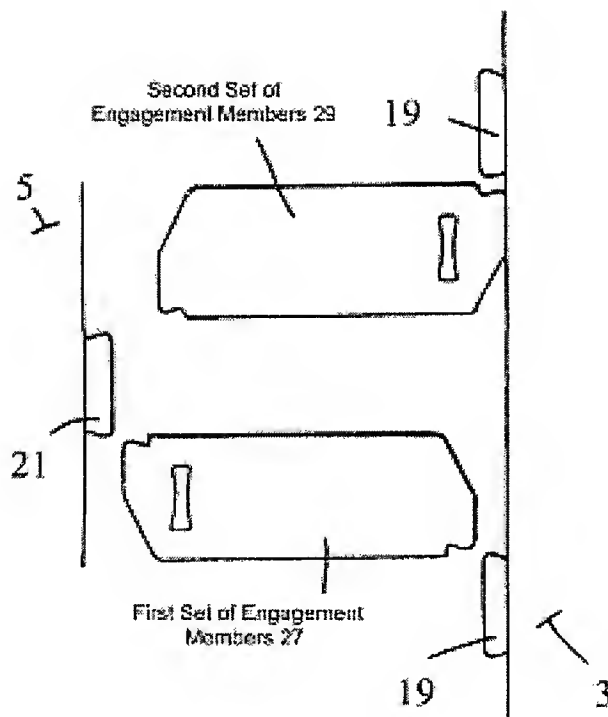
Claim 26 is rejected under 35 U.S.C. §103(a) as being unpatentable over Thomas '737. Applicant respectfully disagrees with the rejection for the reasons noted below. However, Applicant has canceled Claim 26, and has moved at least some of the limitations of Claim 26 into new Claim 40. Thus, the rejection will be addressed in connection with new Claim 40.

When performing a kickdown shift the relative geometries of the higher and lower gears means that the relative speeds of the engagement members (since these rotate with the higher gear) and the lower gear are such that the engagement faces move away from the dogs on the lower gear rather than into engagement. This problem is common to both the current application and Thomas '737 (see Thomas '737, column 6, lines 33 to 57 – *the connector element 61 rotates at a higher speed than the connector element 59 and the gear rotating therewith.*) since it is due to the relative sizes of the gear wheels – i.e. is a matter of physics.

Thomas '737 addresses this problem by having depressible connector elements 61 (see Thomas '737, column 9 line 60 to column 10 line 10). This enables the connector elements 61 to retract into the selector element 37 when the connector elements 61 collide with the connector elements 59 (see Figure 5A) and quickly moving the stop members 43 into engagement with the connector elements 59 after the connector elements 61 have moved past the connector elements 59 (see also column 6, lines 33 to 57).

In contrast, previous Claim 26 recited, in part, "briefly interrupting torque to the transmission system thereby allowing disengagement of the engaged gear wheel prior to the shift; and subsequently selecting an unengaged gear wheel."





As illustrated above for example, Claim 26 provided a different solution, which is to interrupt torque to the transmission system, thereby relieving the drive pressure between the loaded first set of engagement members and the higher gear 5 to enable the first set of engagement members to be disengaged from the higher gear 5 prior to the shift, that is, prior to selecting the lower gear 3 with the unloaded second set of engagement members 29. Thus when the second set of engagement members 29 engages the lower gear 3 they are no longer driven at the same speed as the higher gear 5 because the first set of engagement members 27 is not in engagement with the higher gear 5 at the time the lower gear 3 is selected. Using this method has the advantage that it is not necessary to have the complicated depressible connector elements 61 of Thomas '737, which makes for a much simpler and more robust selector assembly. Furthermore, it avoids the situation wherein the connector elements 61 and 59 collide in a non-engaging fashion. It is submitted that with the speeds and forces involved, the colliding of connector elements in a non-engaging manner would be very noisy. This method is not taught or disclosed in the prior art.

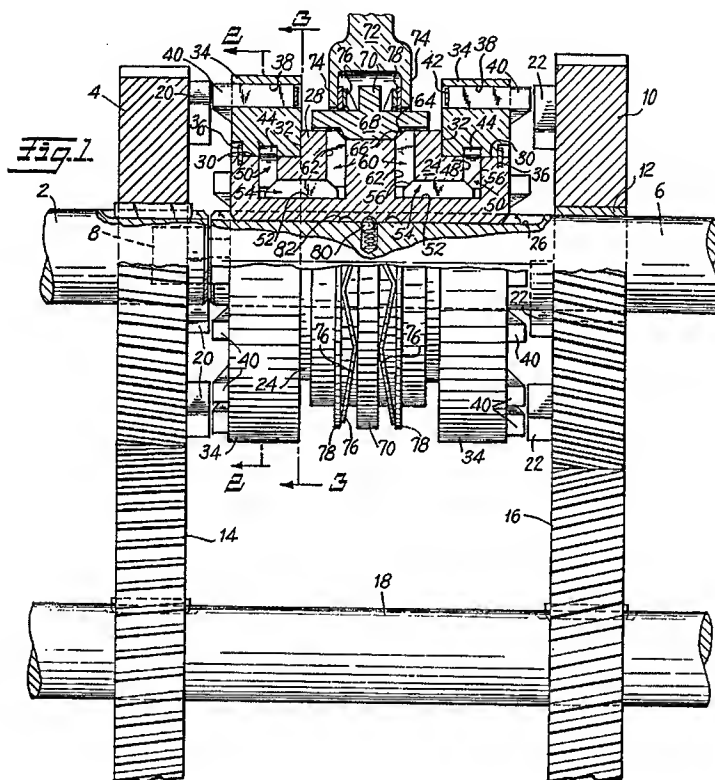
For at least the reasons described above, Applicant submits that Claim 40 is patentably distinguished over Thomas '737.



# Rejection of Claim 25 Under 35 U.S.C. §103(a)

Claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over Thomas '737 in view of US 4,098,380 to Thomas (Thomas '380). However, Claim 25 is patentable over this combination of references.

Thomas '737 is described above. Thomas '380 teaches disc springs 76 (as shown below in Fig. 1 of Thomas '380) that normally hold the shift fork 72 in centralized relation to the rib 70. When the springs 76 are compressed they are configured to apply resilient pressure to a side of rib 70.



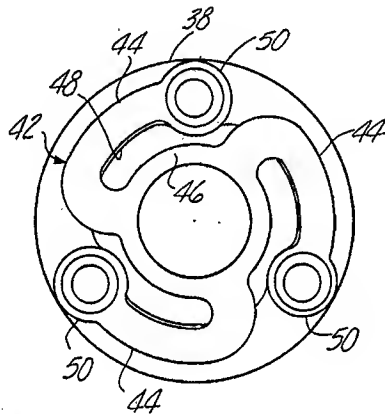
Thomas '380 does not disclose or suggest initially moving an unloaded first set of engagement members into driving engagement with a first gear wheel to effect a decelerating downshift. Nor does Thomas '380 disclose that backlash between first and second sets of engagement members and drive formations when moving between acceleration and deceleration is less than or equal to four degrees.

For at least the reasons discussed above with respect to Claim 1, Applicant submits that Claim 25 is patentably distinct over the combination of Thomas' 737 and Thomas '380, not only because it depends from Claim 1, but also on its own merit.

**Rejection of Claim 20 under 35 U.S.C. §103(a)**

Claim 20 was rejected under 35 U.S.C. §103(a) as being unpatentable over Thomas '737 in view of Thomas '380, and further in view of US 4,241,818 to Miller (Miller). Applicant respectfully disagrees with the rejection.

Thomas '737 and Thomas '380 are described above. Miller teaches a spider spring 42 configured with three arms 44 emanating from a central portion 46, as shown below in Fig. 3 of Miller.



**Fig - 3**

Miller does not disclose or suggest initially moving an unloaded first set of engagement members into driving engagement with a first gear wheel to effect a decelerating downshift. Nor does Miller disclose that backlash between first and second sets of engagement members and drive formations when moving between acceleration and deceleration is less than or equal to four degrees.

For at least the reasons discussed above with respect to Claim 1, Applicant submits that Claim 20 is patentably distinct over the combination of Thomas' 737, Thomas '380, and Miller, not only because it depends from Claim 1, but also on its own merit.

### **New Claims 35-37**

New Claims 35-37 depend from Claim 1. For at least the reasons discussed above, Applicant submits that Claims 35-37 are patentably distinct over the cited references, not only because they depend from Claim 1, but also on their own merit.

### **New Claims 38-41**

As described above, none of the cited references disclose or suggest engaging a second gear wheel with a second set of engagement members such that each of the engagement members in the second set engages the second gear wheel with a first engagement face, and such that backlash between the first and second sets of engagement members and drive formations when moving between acceleration and deceleration is less than or equal to four degrees, and starting from a position wherein the second set of engagement members drivingly engages the second gear wheel and the first set of engagement members is in an unloaded condition with respect to the second gear wheel, initially moving the unloaded first set of engagement members along a longitudinal axis of a first shaft by action of a fork assembly into engagement with the first gear wheel such that each of the engagement members in the first set engages the second gear wheel with a second engagement face, thereby transmitting torque between the first shaft and the first gear wheel to effect the gear change.

In contrast, Claim 38 recites, in part, “engaging the second gear wheel with the second set of engagement members such that each of the engagement members in the second set engages the second gear wheel with a first engagement face, and such that backlash between the first and second sets of engagement members and the drive formations when moving between acceleration and deceleration is less than or equal to four degrees; and starting from a position wherein the second set of engagement members drivingly engages the second gear wheel and the first set of engagement members is in an unloaded condition with respect to the second gear wheel, initially moving the unloaded first set of engagement members along the longitudinal axis of the first shaft by action of the fork assembly into engagement with the first gear wheel such that each of the engagement members in the first set engages the second gear wheel with a second engagement face, thereby transmitting torque between the first shaft and the first gear wheel to effect the gear change.”

For at least the reasons discussed above, Applicant submits that Claim 38 is patentably distinct over the cited references. Applicant submits that Claims 39-41 are also patentably distinct over the cited references, not only because they depend from Claim 38, but also on their own merit.

#### **New Claims 42-50**

As described above, none of the cited references disclose or suggest starting from a position wherein a first set of engagement members drivingly engages a second gear wheel and a second set of engagement members is in an unloaded condition with respect to a second gear wheel, briefly interrupting torque to a transmission system to disengage the first set of engagement members from the second gear wheel, and subsequently moving the unloaded second set of engagement members along a longitudinal axis of a first shaft into engagement with a first gear wheel such that each of the engagement members in the second set engages the second gear wheel with a second engagement face thereby transmitting torque between the first shaft and the first gear wheel, to effect a gear change.

In contrast, Claim 42 recites, in part, “starting from a position wherein the first set of engagement members drivingly engages the second gear wheel and the second set of engagement members is in an unloaded condition with respect to the second gear wheel; briefly interrupting torque to the transmission system to disengage the first set of engagement members from the second gear wheel; and subsequently moving the unloaded second set of engagement members along the longitudinal axis of the first shaft into engagement with the first gear wheel such that each of the engagement members in the second set engages the second gear wheel with a second engagement face thereby transmitting torque between the first shaft and the first gear wheel, to effect the gear change.”

For at least the reasons described above, Applicant submits that Claim 42 is patentably distinguished over the cited references. Applicant submit that Claims 43-50 are also patentably distinguished over the cited references, not only because they depend from Claim 42, but also on their own merit.

#### **No Disclaimers or Disavowals**

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this

application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

### CONCLUSION

For the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding Office Action are inapplicable to the present claims. Accordingly, early issuance of a Notice of Allowance is most earnestly solicited.

The undersigned has made a good faith effort to respond to all of the rejections in the case and to place the claims in condition for immediate allowance. Nevertheless, if any undeveloped issues remain or if any issues require clarification, the Examiner is respectfully requested to call Applicant's attorney in order to resolve such issue promptly.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Account No. 11-1410.

Respectfully submitted,

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